

Work Order ID 75637

75637

Page 1

October-27-11 11:39:53 AM

Item ID: D6002-115 Accept *N9000040100* Setup Start *NS1*
 Revision ID: Stop *NS2*
 Item Name: Crosstube Material
 Start Date: 27/10/2011 Start Qty: 20.00 *20* Cust Item ID:
 Required Date: 30/04/2013 Req'd Qty: 20.00 *20* Customer:
 Reference:

Approvals: Process Plan: M.L.J Date: 11/10/27 Tooling: Date: Run Start *NR1*
 QC: Date: SPC (Y/N): Date: Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D6002	Rev A								

100 PURCHASING 0.00
 100
 Purchasing Memo 0.00
 Purchasing

Issue P/O 15347 a) Extrude as per Dwg D6002b) Material: 7075-T6/T6511 (WW-T-700/7 or QQ-A-225/9or QQ-A-200/11) seamless aluminum tube)Minimum ultimate tensile strength = 77 ksi)Minimum tensile yield strenght=66 ksi)Material certification

CL 11/11/03 20

110 Receive & Inspect for Damage & Mat'l Certs 0.00
 110
 Packaging Memo 0.00
 Packaging Ensure material certification is attached

13/3/28 (21)

120 QC6- Inspect dimensions to drawing 0.00
 120
 QC Memo 0.00
 Quality Control Ensure Material certification comply to Dwg D6002

DAS 16 9-03 13/10/10

X See attach. Dim sketch

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 75637***75637***

Page 2

October-27-11 11:39:53 AM

Item ID: D6002-115 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: Stop ***NS2***
Item Name: Crosstube Material
Start Date: 27/10/2011 Start Qty: 20.00 ***20*** Cust Item ID:
Required Date: 30/04/2013 Req'd Qty: 20.00 ***20*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130 *130* HandFinish Hand Finishing	Chemical Conversion Coat per QSI005 4.1 Memo	0.00 M/45 0.00							
140 *140* Packaging Packaging	Identify as per dwg & Stock Location: <u>LG 015</u> Memo <u>MAT 26</u>	0.00 0.00							
150 *150* QC Quality Control	QC21- Final Inspection - Work Order Release Memo	0.00 0.00							

13/5/13 JH
MCS 13-05-13

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



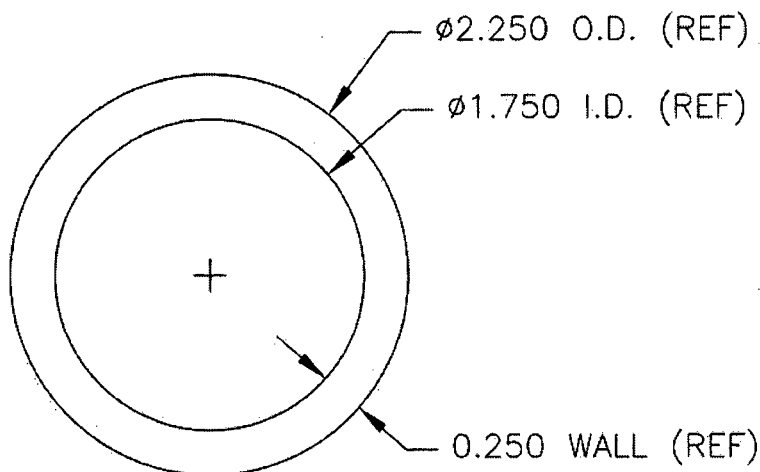
DESIGN <i>CP</i>	DRAWN BY <i>CP</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>A</i>	APPROVED <i>A</i>	DRAWING NO. D6002	REV. A SHEET 1 OF 1
DATE 00.11.22		TITLE CROSSTUBE MATERIAL	SCALE 1:1
A	00.11.22	NEW ISSUE	

SPECIFICATION CONTROL DRAWING

RELEASED
00.11.24 *CP*

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT

WITHOUT NOTICE
WORK ORDER
NO. 75637 M.L.J
11/10/27



NOTES

- 1) D6002-XXX CROSSTUBE
└──┘
LENGTH

WHERE XXX IS LENGTH IN INCHES
EG. 115" LONG TUBE: D6002-115

- 2) MATERIAL: 2.250 OD x 0.250 WALL 7075-T6/T6511 (WW-T-700/7 OR QQ-A-225/9 OR QQ-A-200/11) SEAMLESS ALUMINUM TUBE.
MINIMUM ULTIMATE TENSILE STRENGTH = 77 ksi
MINIMUM YIELD TENSILE STRENGTH = 66 ksi
- 3) TOLERANCES ARE PER ASTM B210 AS FOLLOWS:
O.D.: ± 0.006 MEAN (± 0.012 INCLUDING OVALITY)
WALL: ± 0.008 MEAN (± 0.025 INCLUDING ECCENTRICITY)
LENGTH: XXX $+0.125/-0.000$
STRAIGHTNESS: 0.010" DEVIATION / 12" LENGTH
- 4) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 5) CHEMICAL CONVERSION COAT PER DART QSI 005 4.1

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDERPurchase Order ID **PO15347**

Purchase Order Date 11/03/11

PO Print Date 12/07/11

Page Number 2 of 2

Order From :

VU-ALU001

ALUMINIUMWERK UNNA AG
630 3033 SOUTH PARKER RD
AURORA, CO 80014
USA

Contact Name		Buyer	Chantal Lavoie
Vendor Phone	303 755 5672	Requisition Nbr	
Vendor Fax	303 755 5936	Tax Resale Nbr	10127-2607
Vendor Account Nbr		Terms	Net 30
		Currency	USD
		FOB	Destination-Collect

Special Inst: AS PER DWG D6004 REV. A
B75636
MATERIAL: 7075-T6/T6511 AS PER WW-
T-700/7 OR
QQ-A-200/11 OR QQ-A-225/9 SEAMLESS
TUBE
MINIMUM ULTIMATE TENSILE
STRENGTH = 77 KSI
MINIMUM TENSILE YIELD STRENGTH
= 66 KSI
SIZE: 2.50" OD X 0.350" WALL X 115"
LONG

3	D6002-115P	Crosstube material	3/29/13	20.00	\$307.0000	\$6,140.00
			Yes	Each		

NCC 21

Special Inst: AS PER DWG D6002 REV. A
B75637
MATERIAL: 7075-T6/T6511 AS PER WW-
T-700/7 OR
QQ-A-200/11 OR QQ-A-225/9 SEAMLESS
TUBE
MINIMUM ULTIMATE TENSILE
STRENGTH = 77 KSI
MINIMUM TENSILE YIELD STRENGTH
= 66 KSI
SIZE: 2.250" OD X 0.250" WALL X 115"
LONG

PO Total: \$31,280.00

No substitution or deviation without
consent.
Certificate of Conformity or Material
Certification required when applicable

Unna ref. no.	44990/300
Customer PO.	Po. 15347
Date:	02.18.13

Dart Aerospace Po. 15347
D6002-115
Made in Germany Dest.: Hawkesbury Ont, Canada

are from live plant pests

S:\VERSAND\USA Packliste\44990_300

Abnahmeprüfzeugnis 3.1 - DIN EN 10204:2005

Inspection Certificate 3.1 - DIN EN 10204:2005 / Certificat de Reception 3.1- DIN EN 10204:2005

Kunde: Dart Aerospace Ltd.
Client: 1270 Aberdeen Street
 K6A1K7 Hawkesbury, ON Canada

Zeugnisnummer: 167/13
 Cert No.: / No. du certificat:
Bestellnummer: PO 15347
 Order No. / No. de commande
Auftrag: 44990/300
 Our Reference/Notre Reference:

Produkt: Rohre nahtlos gepresst
 Product / Produit: Tubes seamless extruded
Spezifikation: AMS - QQ - A - 200/11; Spezifikation Dart Aerospace D6001
 Specification:

Werkstoff: 7075
 Alloy/Alliage: **Zustand:** T 6511
 Temper/État

Abmessung: 2,250 INCH x 1,750 INCH x 0,250 INCH x 115,000 INCH
 Size / Dimension D6002-115 2.250 X 0.250 X 115

Kennzeichnung: ALUnna - CERT.NO. 167/13 - 7075 - T6511 - CAST NO. 8861 - AMS - QQ - A - 200/11 - 2.250" OD X 0.250"WALL - HEAT LOT NO. 1401522 - ALUNNA ORDER CONF. NO. 44990/300-1 - P.O.15347
 Marking/Marquage:

Lieferung: pcs. lbs
 Delivered Material / Matériel délivré: 21 392
Country of Manufacture: Germany
 Products are in accordance with applicable RoHS

1. Chemische Analyse

Chemical Analysis / analyse chimique

Other elements
 each max. 0.05 %, total 0.15 %

	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Pb	Zr	Bi	Sn	Ni
Charge/ min.			1,2		2,1	0,18	5,1						
Cast No. max.	0,40	0,50	2,0	0,30	2,9	0,28	6,1	0,20					
8861/13	0,085	0,162	1,466	0,046	2,314	0,205	5,755	0,037	0,003	0,0193	0,0001	0,0017	0,0001

Hydrogen content: 0,11

ccm/100 g Al Elements without indication < 0,01 %

country of melt manufacturer: Germany

2. Mécanische Eigenschaften

Mechanical Properties / Valeurs Mécaniques

Anforderungen Requirements	tensile (Rm) ksi	yield (Rp0,2) ksi	elongation 2" %	elongation A %	Hardness HB	Heat Lot No.
min. max.	77,0	66,0	7,0			
1	82,650	73,805	11,0			1401522

RMS: outside 25 - max. 8,0 µ"

Ergebnis der Prüfungen: Es wird bestätigt, daß die Lieferung geprüft wurde und den Vereinbarungen bei der Bestellannahme entspricht

Test results: We confirm that the delivery has been tested and applies to the agreements made on receipt of the order

Resultats: Nous confirmons que la livraison a été contrôlée et correspond avec les conventions faites à la réception de la commande

EXTRUSION INSPECTION SHEET

		SIDE A		SIDE B		ULTRA SONIC MEASUREMENTS						
TUBE #	TOTAL LENGTH	DIA two readings	DIA two readings	INSIDE DIA	wall thickness measured w/vern	Strightness at 12" in middle	Rockwell Reading	LOCATION on tube	R1	R2	R3	R4
DWG	115.00"	2.250"		1.750"	0.250"	0.010"	N/A	Middle	N/A			
1	115.00"	2.251"/2.246"	2.251"/2.250"	1.740"	0.260"/0.249"	0.002"	N/A	Middle	0.258"	0.252"	0.259"	0.260"
2	115.00"	2.249"/2.247"	2.251"/2.248"	1.735"	0.260"/0.251"	0.002"	N/A	Middle	0.246"	0.256"	0.258"	0.268"
3	115.00"	2.251"/2.248"	2.253"/2.251"	1.734"	0.260"/0.253"	0.0045"	N/A	Middle	0.251"	0.263"	0.259"	0.258"
4	115.00"	2.252"/2.246"	2.254"/2.250"	1.735"	0.253"/0.251"	0.0075"	N/A	Middle	0.247"	0.257"	0.268"	0.256"
5	115.00"	2.253"/2.248"	2.251"/2.248"	1.736"	0.258"/0.253"	0.0025"	N/A	Middle	0.254"	0.264"	0.261"	0.251"
6	115.00"	2.254"/2.253"	2.258"/2.256"	1.741"	0.260"/0.255"	0.005"	N/A	Middle	0.261"	0.266"	0.259"	0.252"
7	115.00"	2.253"/2.247"	2.253"/2.249"	1.735"	0.261"/0.254"	0.002"	N/A	Middle	0.266"	0.261"	0.249"	0.255"
8	115.00"	2.254"/2.252"	2.254"/2.249"	1.734"	0.258"/0.249"	0.002"	N/A	Middle	0.264"	0.253"	0.249"	0.251"
9	115.00"	2.253"/2.247"	2.255"/2.251"	1.740"	0.259"/0.251"	0.002"	N/A	Middle	0.249"	0.256"	0.258"	0.252"
10	115.00"	2.249"/2.246"	2.250"/2.249"	1.735"	0.255"/0.249"	0.0025"	N/A	Middle	0.251"	0.241"	0.263"	0.256"
11							N/A	Middle				
12							N/A	Middle				
13							N/A	Middle				
14							N/A	Middle				
15							N/A	Middle				
PART # D6002-115		P/O# 15347			BATCH # B75637			Notes:				

MEAN OUTSIDE DIAMETER PERMISSIBLE ± 0.006 side A

Tube #	Actual A	Actual B	Mean	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.251	2.246	2.249	2.250	0.006	2.244	2.256	0.004	-0.007
2	2.249	2.247	2.248	2.250	0.006	2.244	2.256	0.004	-0.008
3	2.251	2.248	2.250	2.250	0.006	2.244	2.256	0.006	-0.006
4	2.252	2.246	2.249	2.250	0.006	2.244	2.256	0.005	-0.007
5	2.253	2.248	2.251	2.250	0.006	2.244	2.256	0.006	-0.005
6	2.254	2.253	2.254	2.250	0.006	2.244	2.256	0.009	-0.002
7	2.253	2.247	2.250	2.250	0.006	2.244	2.256	0.006	-0.006
8	2.254	2.252	2.253	2.250	0.006	2.244	2.256	0.009	-0.003
9	2.253	2.247	2.250	2.250	0.006	2.244	2.256	0.006	-0.006
10	2.249	2.246	2.248	2.250	0.006	2.244	2.256	0.003	-0.008
11			#DIV/0!		0.006	-0.006	0.006	#DIV/0!	#DIV/0!
12			#DIV/0!		0.006	-0.006	0.006	#DIV/0!	#DIV/0!
13									
14									
15									
16									

MEAN OUTSIDE DIAMETER PERMISSIBLE ± 0.006 side B

Tube #	Actual A	Actual B	Mean	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.251	2.250	2.251	2.250	0.006	2.244	2.256	0.006	-0.006
2	2.251	2.248	2.250	2.250	0.006	2.244	2.256	0.006	-0.006
3	2.253	2.251	2.252	2.250	0.006	2.244	2.256	0.008	-0.004
4	2.254	2.250	2.252	2.250	0.006	2.244	2.256	0.008	-0.004
5	2.251	2.248	2.250	2.250	0.006	2.244	2.256	0.006	-0.006
6	2.258	2.256	2.257	2.250	0.006	2.244	2.256	0.013	0.001
7	2.253	2.249	2.251	2.250	0.006	2.244	2.256	0.007	-0.005
8	2.254	2.249	2.252	2.250	0.006	2.244	2.256	0.007	-0.004
9	2.255	2.251	2.253	2.250	0.006	2.244	2.256	0.009	-0.003
10	2.250	2.249	2.250	2.250	0.006	2.244	2.256	0.006	-0.006
11			#DIV/0!		0.006	-0.006	0.006	#DIV/0!	#DIV/0!
12			#DIV/0!		0.006	-0.006	0.006	#DIV/0!	#DIV/0!
13									
14									
15									
16									

OUTSIDE DIA. Permissible (with Ovality) ± 0.012 side A

Tube #	Actual A	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.251	2.250	0.012	2.238	2.262	0.013	-0.011
2	2.249	2.250	0.012	2.238	2.262	0.011	-0.013
3	2.251	2.250	0.012	2.238	2.262	0.013	-0.011
4	2.252	2.250	0.012	2.238	2.262	0.014	-0.010
5	2.253	2.250	0.012	2.238	2.262	0.015	-0.009
6	2.254	2.250	0.012	2.238	2.262	0.016	-0.008
7	2.253	2.250	0.012	2.238	2.262	0.015	-0.009
8	2.254	2.250	0.012	2.238	2.262	0.016	-0.008
9	2.253	2.250	0.012	2.238	2.262	0.015	-0.009
10	2.249	2.250	0.012	2.238	2.262	0.011	-0.013
11			0.012	-0.012	0.012	0.012	-0.012
12			0.012	-0.012	0.012	0.012	-0.012
13							
14							
15							
16							

OUTSIDE DIA. Permissible (with Ovality) ± 0.012 side b

Tube #	Actual A	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.251	2.250	0.012	2.238	2.262	0.013	-0.011
2	2.251	2.250	0.012	2.238	2.262	0.013	-0.011
3	2.253	2.250	0.012	2.238	2.262	0.015	-0.009
4	2.254	2.250	0.012	2.238	2.262	0.016	-0.008
5	2.251	2.250	0.012	2.238	2.262	0.013	-0.011
6	2.258	2.250	0.012	2.238	2.262	0.020	-0.004
7	2.253	2.250	0.012	2.238	2.262	0.015	-0.009
8	2.254	2.250	0.012	2.238	2.262	0.016	-0.008
9	2.255	2.250	0.012	2.238	2.262	0.017	-0.007
10	2.250	2.250	0.012	2.238	2.262	0.012	-0.012
11			0.012	-0.012	0.012	0.012	-0.012
12			0.012	-0.012	0.012	0.012	-0.012
13							
14							
15							
16							

OUTSIDE DIA. Permissible (with Ovality) ± 0.012 side A

Tube #	Actual B	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.246	2.250	0.012	2.238	2.262	0.008	-0.016
2	2.247	2.250	0.012	2.238	2.262	0.009	-0.015
3	2.248	2.250	0.012	2.238	2.262	0.010	-0.014
4	2.246	2.250	0.012	2.238	2.262	0.008	-0.016
5	2.248	2.250	0.012	2.238	2.262	0.010	-0.014
6	2.253	2.250	0.012	2.238	2.262	0.015	-0.009
7	2.247	2.250	0.012	2.238	2.262	0.009	-0.015
8	2.252	2.250	0.012	2.238	2.262	0.014	-0.010
9	2.247	2.250	0.012	2.238	2.262	0.009	-0.015
10	2.246	2.250	0.012	2.238	2.262	0.008	-0.016
11			0.012	-0.012	0.012	0.012	-0.012
12			0.012	-0.012	0.012	0.012	-0.012
13							
14							
15							
16							

OUTSIDE DIA. Permissible (with Ovality) ± 0.012 side b

Tube #	Actual B	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.250	2.250	0.012	2.238	2.262	0.012	-0.012
2	2.248	2.250	0.012	2.238	2.262	0.010	-0.014
3	2.251	2.250	0.012	2.238	2.262	0.013	-0.011
4	2.250	2.250	0.012	2.238	2.262	0.012	-0.012
5	2.248	2.250	0.012	2.238	2.262	0.010	-0.014
6	2.256	2.250	0.012	2.238	2.262	0.018	-0.006
7	2.249	2.250	0.012	2.238	2.262	0.011	-0.013
8	2.249	2.250	0.012	2.238	2.262	0.011	-0.013
9	2.251	2.250	0.012	2.238	2.262	0.013	-0.011
10	2.249	2.250	0.012	2.238	2.262	0.011	-0.013
11			0.012	-0.012	0.012	0.012	-0.012
12			0.012	-0.012	0.012	0.012	-0.012
13							
14							
15							
16							

end measurement with vern

Mean OUTSIDE DIA. Permissible +- 0.015									
Tube	Actual A	Actual B	Mean	Nominal	Tolerance	min	max	min	max
1	0.260	0.249	0.255	0.250	0.015	0.235	0.265	0.0195	-0.011
2	0.260	0.251	0.256	0.250	0.015	0.235	0.265	0.0205	-0.010
3	0.260	0.253	0.257	0.250	0.015	0.235	0.265	0.0215	-0.009
4	0.253	0.251	0.252	0.250	0.015	0.235	0.265	0.017	-0.013
5	0.258	0.253	0.256	0.250	0.015	0.235	0.265	0.0205	-0.010
6	0.260	0.255	0.258	0.250	0.015	0.235	0.265	0.0225	-0.008
7	0.261	0.254	0.258	0.250	0.015	0.235	0.265	0.0225	-0.008
8	0.258	0.249	0.254	0.250	0.015	0.235	0.265	0.0185	-0.012
9	0.259	0.251	0.255	0.250	0.015	0.235	0.265	0.02	-0.010
10	0.255	0.249	0.252	0.250	0.015	0.235	0.265	0.017	-0.013
11			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
12			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
13			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
14			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
15			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!

OUTSIDE DIA. Permissible +- 0.038								
Tube	Actual A	Actual B	Nominal	Tolerance	min	max	min	max
1	0.260	0.249	0.250	0.038	0.212	0.288	0.048	-0.039
2	0.260	0.251	0.250	0.038	0.212	0.288	0.048	-0.037
3	0.260	0.253	0.250	0.038	0.212	0.288	0.048	-0.035
4	0.253	0.251	0.250	0.038	0.212	0.288	0.041	-0.037
5	0.258	0.253	0.250	0.038	0.212	0.288	0.046	-0.035
6	0.260	0.255	0.250	0.038	0.212	0.288	0.048	-0.033
7	0.261	0.254	0.250	0.038	0.212	0.288	0.049	-0.034
8	0.258	0.249	0.250	0.038	0.212	0.288	0.046	-0.039
9	0.259	0.251	0.250	0.038	0.212	0.288	0.047	-0.037
10	0.255	0.249	0.250	0.038	0.212	0.288	0.043	-0.039
11				0.038	-0.038	0.038	0.038	-0.038
12				0.038	-0.038	0.038	0.038	-0.038
13				0.038	-0.038	0.038	0.038	-0.038
14				0.038	-0.038	0.038	0.038	-0.038
15				0.038	-0.038	0.038	0.038	-0.038

center measurment with ultra sonic

Mean OUTSIDE DIA. Permissible +- 0.015									
Tube	highest	lowest	Mean	Nominal	Tolerance	min	max	min	max
1	0.260	0.252	0.256	0.250	0.015	0.235	0.265	0.021	-0.009
2	0.268	0.246	0.257	0.250	0.015	0.235	0.265	0.022	-0.008
3	0.263	0.251	0.257	0.250	0.015	0.235	0.265	0.022	-0.008
4	0.268	0.247	0.258	0.250	0.015	0.235	0.265	0.0225	-0.008
5	0.264	0.251	0.258	0.250	0.015	0.235	0.265	0.0225	-0.008
6	0.266	0.252	0.259	0.250	0.015	0.235	0.265	0.024	-0.006
7	0.266	0.249	0.258	0.250	0.015	0.235	0.265	0.0225	-0.008
8	0.264	0.249	0.257	0.250	0.015	0.235	0.265	0.0215	-0.009
9	0.258	0.249	0.254	0.250	0.015	0.235	0.265	0.0185	-0.012
10	0.263	0.241	0.252	0.250	0.015	0.235	0.265	0.017	-0.013
11			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
12			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
13			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
14			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
15			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!

OUTSIDE DIA. Permissible +- 0.038								
Tube	highest	lowest	Nominal	Tolerance	min	max	min	max
1	0.260	0.252	0.250	0.038	0.212	0.288	0.048	-0.036
2	0.268	0.246	0.250	0.038	0.212	0.288	0.056	-0.042
3	0.263	0.251	0.250	0.038	0.212	0.288	0.051	-0.037
4	0.268	0.247	0.250	0.038	0.212	0.288	0.056	-0.041
5	0.264	0.251	0.250	0.038	0.212	0.288	0.052	-0.037
6	0.266	0.252	0.250	0.038	0.212	0.288	0.054	-0.036
7	0.266	0.249	0.250	0.038	0.212	0.288	0.054	-0.039
8	0.264	0.249	0.250	0.038	0.212	0.288	0.052	-0.039
9	0.258	0.249	0.250	0.038	0.212	0.288	0.046	-0.039
10	0.263	0.241	0.250	0.038	0.212	0.288	0.051	-0.047
11				0.038	-0.038	0.038	0.038	-0.038
12				0.038	-0.038	0.038	0.038	-0.038
13				0.038	-0.038	0.038	0.038	-0.038
14				0.038	-0.038	0.038	0.038	-0.038
15				-0.038	-0.038	-0.038	-0.038	-0.038